Winds offshore in Northern Europe - what do we know today?

Hasager, Charlotte Bay

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Winds offshore in Northern Europe – what do we know today?

C.Hasager*, M.Badger*, A.Peña*, I.Karagali*, P.Astrup*, J.Badger*, A.Hahmann*, A.Mouche+, E. Berge¤, Ø. Byrkjedal¤, A. Stoffelen#, A. Oldroyd^

*Risø DTU, Denmark; + CLS, France; ¤ Kjeller Vindteknikk, Norway; # KNMI, the Netherlands; ^Oldbaum Services, Scotland

Abstracts

Within the EU Norsewind project (2008-2012) a state-of-the-art wind atlas is in development.

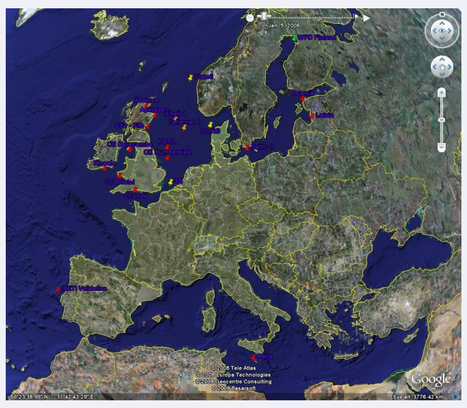
The data sources, methods and models used to predict the offshore wind resource potential is presented.

The data sources include observations from offshore meteorological masts, offshore wind lidars mounted on platforms and satellite-based wind maps.

The modeling is by the mesoscale wind resource version of the WRF model (Weather Research and Forecast Model).

Results from the 1st focus-area of the Norsewind project are presented.

Lidar and met-data



Nominal lidar sites

Nominal met-mast sites

The Norsewind study area includes the Baltic, Irish and North Sea plus the Atlantic Ocean offshore Portugal.

Testing lidar-data vs. met-data at Høvsøre.

Høvsøre sunset.

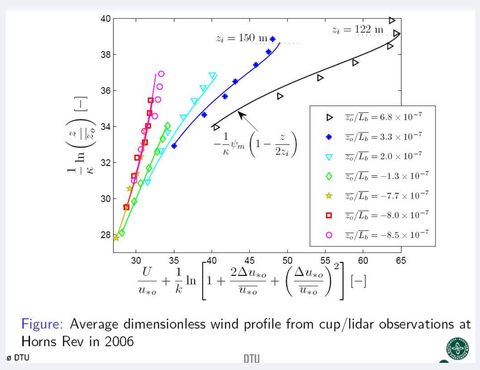
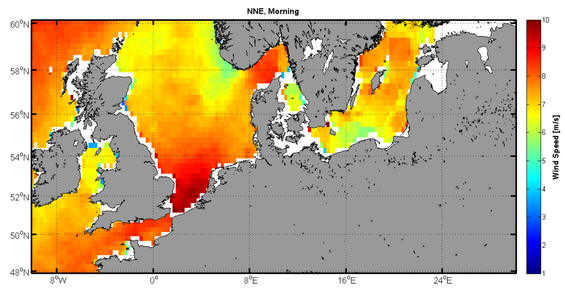


Figure: Average dimensionless wind profile from cup/lidar observations at Horns Rev in 2006

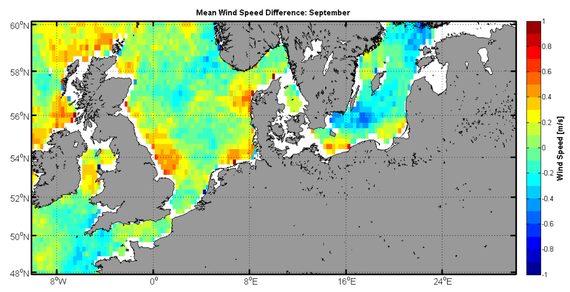
Cup- and lidar offshore analysis of the vertical profile.

Satellite-based Results

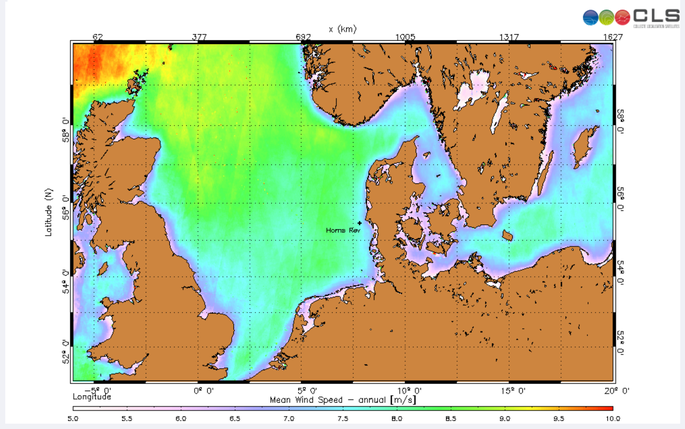
The satellite information is from Envisat ASAR, QuikSCAT, ASCAT and SSM/I. The satellite-based wind maps are analyzed in respect to diurnal variations and will be compared to in-situ data and to mesoscale model results. There will be so-called stand-alone satellite-based maps using each of the available satellite sources and there will also be integrated maps of various sources.



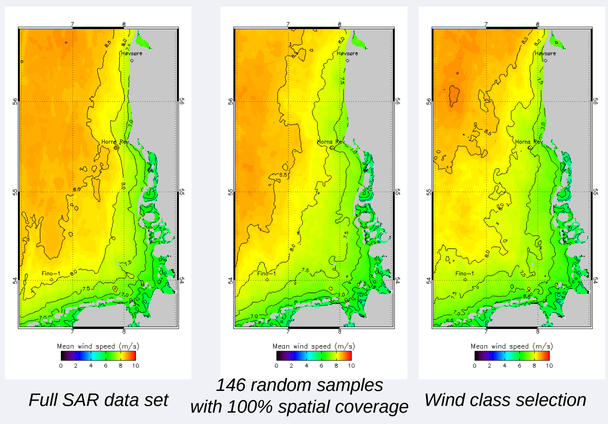
QuikSCAT 10-yr morning data from North-north-east



QuikSCAT 10-yr difference September am-pm

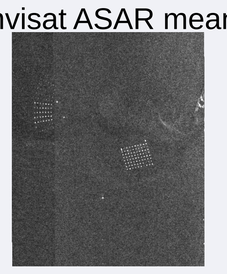


Envisat ASAR mean wind speed

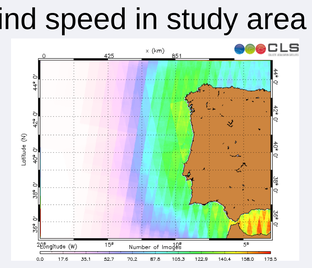


Full SAR data set | *146 random samples with 100% spatial coverage* | *Wind class selection*

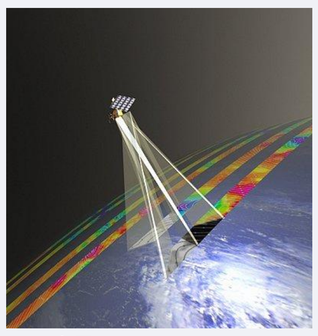
Envisat ASAR mean wind speed in study area



Horns Rev 1 and 2



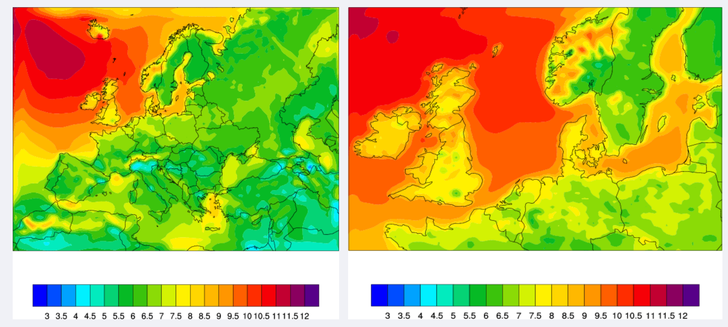
Envisat ASAR Portugal



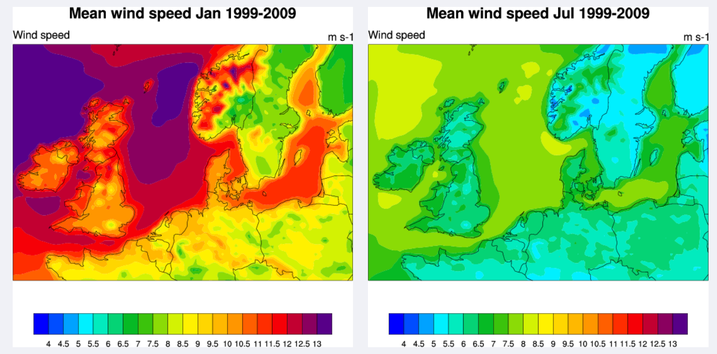
ASCAT: ESA and Eumetsat

Model Results

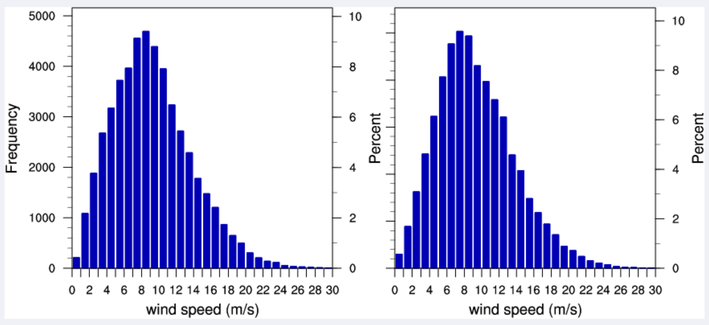
Selected scenarios are modeled by mesoscale wind resource version of the WRF model (Weather Research and Forecast Model). The maps below are from an 11-year downscaling for 1999-2009, with two domains, 45 km and a nest at 15 km. The boundary conditions are from NCAR/NCEP reanalysis II, and the increased resolution SSTs 1/4 degree.



Mean wind speed at 80m for 45km and 15km domain.



Seasonal variability.



Preliminary validation. Comparing wind speed at 100 m at Høvsøre (left) and WRF (right) in years 2004-2009.

Conclusions

The EU-Norsewind project is at mid-term and the first results are obtained.

Results from the focus area will provide basis for the selection of methods for the entire project domain using the lidar observations being observed 2009 to 2011 in the entire area.

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JHU/APL: APL/NOAA ANSWRS.

Contact

www.norsewind.eu

Email: cbha@risoe.dtu.dk